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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/828,809	04/10/2001	Robert Terneu	31642-167413	8396

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PATENT PROSECUTION SERVICES
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EXAMINER	
MARKHAM, WESLEY D	
ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/828,809	TERNEU ET AL.	
	Examiner	Art Unit	
	Wesley D Markham	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *29-95* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *29-95* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 08/660,755.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114 was filed in this application (i.e., on 2/20/2004) after appeal to the Board of Patent Appeals and Interferences, but prior to a decision on the appeal. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 2/20/2004 has been entered.

Response to Amendment

2. Acknowledgement is made of the amendment filed by the applicant on 2/20/2004, in which Claims 82, 84, 90, and 92 were amended and Claims 94 and 95 were added. Claims 29 – 95 are currently pending in U.S. Application Serial No. 09/828,809, and an Office Action on the merits follows.

Claim Objections

3. The objections to Claims 84 and 92, set forth in paragraph 6 of the previous Office Action (i.e., the final Office Action mailed on 10/17/2002), <u>are withdrawn</u> in light of the applicant's amendment, in which the term “LT” was amended to read “TL”.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. The rejection of Claims 82 and 90 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, set forth in paragraph 10 of the previous Office Action, <u>is withdrawn</u> in light of the applicant's amendment in which the aforementioned claims were amended to clearly state that the "dominant wavelength" refers to the wavelength in transmission of the glazing panel.

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. **Claims 29 – 45, 47 – 52, 61, 69, and 94** are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, the limitations that the glazing panel has a luminous transmittance (TL) of "less than 70%" and "less than 60%" lack sufficient written description under 35 U.S.C. 112, first paragraph. In the response filed on 2/20/2004,

the applicant points to examples in the specification (see Tables 1.1, 1.2 through 1.5, 2A, and 2B) of glazing panels having various TL values of less than 70%. The applicant states that the totality of the examples (about 57 overall) is sufficient to provide written support for the claimed range. In response, the examiner disagrees. Specifically, these examples, even when taken in totality, do not constitute an original disclosure of the ranges of TL values of "less than 70%" and "less than 60%" as recited in the claims. For example, the presently claimed ranges are open-ended. In other words, the claimed TL ranges of "less than 70%" and "less than 60%" literally read on a TL value of zero or close to zero. After reviewing each of the examples presented by the applicant, the examiner notes that no example shows a glazing panel with a TL value of zero or close to zero. Thus, the claims as presently presented literally read on embodiments not originally disclosed or contemplated by the applicant. The examiner maintains that the original written description does not provide adequate written support (either explicitly, implicitly, or inherently) for the ranges of TL values of "less than 70%" and "less than 60%" as recited in the claims. Please see *In re Wertheim* (191 USPQ 90 (CCPA 1976)), which held that a new claim limitation drawn to an open-ended range (i.e., a situation analogous to the present situation) does not meet the written description requirement since it reads literally on embodiments not originally disclosed. It is also worthy of note that various glazing panels that appear to be part of the applicant's invention have TL values of <u>above 70%</u> (see Table 1.1, as well as Example 1.23). This further supports the examiner's position that a glazing panel having a TL value of less than 70% (or 60%)

was not originally contemplated by the applicant as part of the invention. Please note that Claims 46 and 70 have not been rejected under 35 U.S.C. 112, first paragraph, for lack of written description, because the range of TL values of from 40 to 65% was originally disclosed by the applicant.

8. **Claims 77 – 93** are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, independent Claim 77 (from which Claims 78 – 84 depend) requires (1) depositing at least one intermediate coating layer on a glass ribbon substrate during formation of the glass ribbon whilst it is still hot, (2) forming a tin/antimony oxide coating layer on the intermediate coating layer during formation of the glass ribbon whilst it is still hot, and (3) depositing at least one additional coating layer comprised of fluorine-doped tin oxide on the tin/antimony oxide coating layer. Further, the tin/antimony oxide coating layer must have a thickness between 100 and 470 nm and an Sb/Sn molar ratio of at least 0.03 and less than 0.15. The glazing panel must have a solar factor (FS) of less than 60%, a luminous transmittance of between 40% and 65%, and a luminous reflectance of less than 11%. New independent Claim 85 (from which Claims 86 – 93 depend) has the same limitations as independent Claim 77 except that it does not require a luminous reflectance of less than 11%. The applicant's specification as originally filed does not have support for all of the aforementioned

claim limitations in the combination(s) required by Claims 77 – 93. For example, while the application as originally filed does have support for (1) an intermediate layer below a tin/antimony oxide coating layer or (2) a fluorine-doped tin oxide layer on the tin/antimony oxide coating layer individually, the application as filed does not have support for both an intermediate layer below a tin/antimony oxide coating layer and a fluorine-doped tin oxide layer on the tin/antimony oxide in a single embodiment as required by the newly added claims. Since this is the case, the specification as originally filed clearly does not have support for the claimed characteristics (i.e., solar factor, luminous transmittance, and luminous reflectance) of a glazing panel having all of the aforementioned layers (i.e., the intermediate layer, the tin/antimony oxide coating layer, and the fluorine-doped tin oxide layer) as required by Claims 77 – 93. Therefore, Claims 77 – 93 lack written description under 35 U.S.C. 112, first paragraph. The applicant broadly argues that the specification conveys to one skilled in the art that the applicant had possession of the invention defined by these claims and states that the Office Action fails to meet the required burden (i.e., presenting a preponderance of evidence why a person skilled in the art would not recognize a description of the claimed invention). In response, this argument is not convincing. To begin, the examiner has clearly and explicitly set forth reasons why one skilled in the art would not recognize an original written description of the claimed invention (see the extensive discussion above, which shows why one skilled in the art would not recognize an original written description of the claimed invention when viewed as a whole, specifically the claimed

combination of layers (i.e., an intermediate coating, a specific Sb/Sn oxide coating, and a fluorine doped tin oxide coating) and glazing panel characteristics (i.e., solar factor, luminous transmittance, and luminous reflectance)). Further, the applicant has not shown or attempted to show, either generally or specifically, how or where the aforementioned claimed invention, when viewed in its entirety, was originally described in the specification. As such, the *prima facie* case of lack of written description of Claims 77 – 93 has not been effectively rebutted.

9. **Claims 77 – 93** are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

10. Specifically, new independent Claim 77 (from which Claims 78 – 84 depend) requires (1) depositing at least one intermediate coating layer on a glass ribbon substrate during formation of the glass ribbon whilst it is still hot, (2) forming a tin/antimony oxide coating layer on the intermediate coating layer during formation of the glass ribbon whilst it is still hot, and (3) depositing at least one additional coating layer comprised of fluorine-doped tin oxide on the tin/antimony oxide coating layer. Further, the tin/antimony oxide coating layer must have a thickness between 100 and 470 nm and an Sb/Sn molar ratio of at least 0.03 and less than 0.15. The glazing panel must have a solar factor (FS) of less than 60%, a luminous transmittance of between 40% and 65%, and a luminous reflectance of less than

11%. New independent Claim 85 (from which Claims 86 – 93 depend) has the same limitations as independent Claim 77 except that it does not require a luminous reflectance of less than 11%. One skilled in the art of coating glass would not be able to use the applicant's claimed invention (i.e., the applicant's claimed method) because there is no example, embodiment, or guidance shown or discussed in the specification of the instant application that pertains to coating glass with at least one intermediate coating layer, a tin/antimony oxide coating layer on the intermediate coating layer, and at least one additional coating layer comprised of fluorine-doped tin oxide on the tin/antimony oxide coating layer (i.e., 3 different layers). As such, one of skilled in the art would not know how to obtain the claimed characteristics (solar factor, luminous transmittance, and luminous reflectance) of the coated, 3-or-more layer, glazing panel. For example, how does the thickness of the intermediate layer and/or the fluorine-doped tin oxide layer influence the solar factor, luminous transmittance, and luminous reflectance of the glazing panel? How does one choose an appropriate layer thickness value in combination with the claimed tin/antimony oxide coating layer thickness? Does the amount of fluorine in the fluorine-doped tin oxide layer influence the solar factor, luminous transmittance, and luminous reflectance of the glazing panel? If so, how is this balanced into the equation when forming the claimed glazing panel? In the response filed on 2/20/2004, the applicant argues that one of ordinary skill in the art could have made a glazing panel having the claimed characteristics without undue experimentation, and the Office Action has merely concluded that some experimentation would be required to practice the

claimed invention. This argument is not convincing. Specifically, the examiner maintains that an undue amount of experimentation would be required to obtain a glazing panel as claimed by the applicant. For example, it is uncontradicted that there is no example or embodiment discussed in the specification of the instant application that pertains to coating glass with at least one intermediate coating layer, a tin/antimony oxide coating layer on the intermediate coating layer, and at least one additional coating layer comprised of fluorine-doped tin oxide on the tin/antimony oxide coating layer (i.e., 3 different layers). While the examiner agrees that one skilled in the art would, in general, be enabled to deposit the aforementioned three layers in sequence on a glass substrate, an undue amount of experimentation would be required to do so in a manner sufficient to obtain the claimed characteristics (solar factor, luminous transmittance, and luminous reflectance) of the coated, 3-or-more layer, glazing panel. For example, the applicant's specification does not provide guidance regarding the following issues: how does the thickness of the intermediate layer and/or the fluorine-doped tin oxide layer influence the solar factor, luminous transmittance, and luminous reflectance of the glazing panel? How does one choose an appropriate layer thickness value or values in combination with the claimed tin/antimony oxide coating layer thickness? Does the amount of fluorine in the fluorine-doped tin oxide layer influence the solar factor, luminous transmittance, and luminous reflectance of the glazing panel? If so, how is this balanced into the equation when forming the claimed glazing panel? Without some guidance regarding

these issues, one skilled in the art would not be able to make the claimed glazing panel without undue experimentation.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 29 – 31, 37 – 48, 50, 53 – 55, 61 – 72, 74, and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kavka (CS 239788 B1) in view of Kalbskopf et al. (USPN 4,294,868), in further view of Terneu et al.(3) (USPN 4,900,634) and Buffat et al. (USPN 5,657,149) for the reasons set forth in paragraphs 13 – 14 and 20 – 21 of the previous Office Action and below.

14. Regarding independent **Claims 29 and 53**, Kavka teaches a method of manufacturing a glazing panel comprised of a vitreous substrate and a tin/antimony oxide coating layer provided on the vitreous substrate and having a Sb/Sn molar ratio ranging from 0.01 to 0.5, preferably from 0.03 to 0.5, the method comprising the steps of providing reactants which comprise tin and antimony compounds which are present in an amount effective to form the tin/antimony oxide coating layer, and forming the tin/antimony oxide coating layer on the vitreous substrate from the reactants to provide a glazing panel having a luminous transmittance (TL) of less than 70% (Abstract, page 2, and Example 3). Specifically, Kavka teaches that the substrate is glass (i.e., a "vitreous substrate"), that a layer of tin oxide containing 6% of antimony is formed on the glass (i.e., the Sb/Sn molar ratio is approximately 0.06), and that the transmission in the visible part of the spectrum is 63 – 70% (i.e., the luminous transmittance is less than 70%) (See Example 3). Kavka also teaches that the doped tin oxide coatings are utilized in the production of sheet glass for windows and other glass areas of buildings (i.e., in the production of "glazing panels") (page 2, paragraphs 3 – 4). Kavka does not explicitly teach that (1) the tin and antimony compound reactants are in the gaseous phase, and (2) the coating is formed pyrolytically. Kavka does teach that the reactants are sprayed onto a sheet of glass that is heated to a high temperature, e.g., 560° C (Example). Kavka also suggests that doped tin oxide coatings can be deposited by utilizing reactants in the gaseous phase (page 2, paragraph 5). Kalbskopf et al. teach that, in the art of depositing antimony-doped tin oxide coatings on a glass substrate, it was known at the time of

the applicant's invention to deposit antimony-doped tin oxide coatings pyrolytically by utilizing tin and antimony compound reactants in the gaseous phase (Col.1, lines 6 – 46, Col.3, lines 5 – 12 and 31 – 43, Col.5, Col.6, lines 26 – 54, Col.9, lines 51 – 68, Col.10, lines 1 – 45, and Figure 1b). Kalbskopf et al. also teach that this coating method has the advantages of making it possible to carry out the coating at a very high speed, producing a layer of excellent homogeneity, and guaranteeing a very high performance level with respect to mechanical qualities, electrical qualities, and optical qualities of all kinds (Col.4, lines 22 – 28). Therefore, it would have been obvious to one of ordinary skill in the art to utilize the method of Kalbskopf et al. (i.e., pyrolytically depositing the coating from gaseous tin and antimony compound reactants) to deposit the antimony-doped tin oxide layer of Kavka with the reasonable expectation of (1) success, as Kalbskopf et al. teach that such a method is possible, and (2) obtaining the benefits of utilizing the coating method of Kalbskopf et al., such as carrying out the coating at a very high speed, producing a layer of excellent homogeneity, and guaranteeing a very high performance level with respect to mechanical qualities, electrical qualities, and optical qualities of all kinds. The combination of Kavka and Kalbskopf et al. does not explicitly teach that, based on at least the Sb/Sn molar ratio and the thickness of the tin/antimony oxide coating layer, the glazing panel has a solar factor (FS) of less than 70%. Specifically, Kavka is silent as to the FS of the glazing panel. However, please note that Kavka does teach Sb/Sn molar ratios within the applicant's claimed range (see the discussion above). In addition Kavka notes that the coating deposited in his invention has a high

reflectivity (60 – 70%) of radiant energy in the wavelength region of 5 – 12 μm (Example 3). This teaching at least suggests a low FS value. Further, Kavka is silent as to the exact thickness of the coating layer. However, Kavka does suggest that coatings with a thickness on the order of <u>hundreds of nanometers</u> are operable (page 2, paragraph 3). Terneu et al.(3) teach that, in the art of depositing doped tin oxide coatings on glass substrates for the purposes of reflecting IR-radiation (i.e., the same objective as Kavka), the coatings preferably have a thickness of from 400 nm to 500 nm in order to balance factors such as internal haze, emissivity, and coloration (Col.1, lines 5 – 57, and Col.6, lines 16 – 36). Therefore, it would have been obvious to one of ordinary skill in the art to deposit the coating layer of Kavka to a thickness of 400 nm to 500 nm (i.e., in the range claimed by the applicant) as taught by Terneu et al.(3) with the reasonable expectation of (1) success, as both Kavka and Terneu et al.(3) teach that such coating thickness values are operable, and (2) obtaining the benefit of balancing factors such as internal haze, emissivity, and coloration as taught by Terneu et al.(3). In addition, Buffat et al. teach that, in general, the thickness of coatings on glass influences the solar factor of the coated glass (i.e., larger coating thickness values lead to smaller solar factors) (Col.7, lines 33 – 49). Therefore, the combination of Kavka, Kalbskopf et al., Terneu et al.(3), and Buffat et al. teaches all the limitations of the applicant's claims, including the applicant's claimed <u>Sb/Sn molar ratio</u> and <u>tin/antimony oxide layer thickness</u>. It appears from the applicant's claims that the solar factor of the claimed coated glazing panel is determined by the Sb/Sn molar ratio in the coating and the

tin/antimony oxide layer thickness. Since the combination of Kavka, Kalbskopf et al., Terneu et al.(3), and Buffat et al. teaches the claimed Sb/Sn molar ratio in the coating and the tin/antimony oxide layer thickness (as well as all the other process limitations of the claims), the glazing panel produced by the prior art combination would have inherently had a solar factor of less than 70% as claimed by the applicant. In the alternative, Buffat et al. also teach that a <u>low solar factor is desired</u> for architectural glazing panes so that the panes contribute as little as possible to the rise in temperature inside a building, thereby reducing the cost of air conditioning (Col.1, lines 5 – 50). Further, Buffat et al. teach that the solar factor of a glazing pane is a result / effective variable that must be balanced with the desired light transmission of the pane in order to optimize factors such as (1) how much light is allowed to pass through the pane and (2) the cost of air conditioning (Col.1, lines 5 – 50). Therefore, it would have been obvious to one of ordinary skill in the art to optimize, especially minimize, the solar factor of the glazing pane of Kavka as a result / effective variable through routine experimentation in order to optimize / balance factors such as how much light is allowed to pass through the pane and the cost of air conditioning.

15. The combination of Kavka, Kalbskopf et al., Terneu et al.(3), and Buffat et al. also teaches all the limitations of **Claims 30 – 31, 37 – 48, 50, 54 – 55, 61 – 72, 74, and 94** as set forth above in paragraph 14 and below, including a method wherein / further comprising:

- Claims 30 and 54 – The reactants in the gaseous phase comprise a gaseous reactant mixture, and the tin/antimony oxide coating layer is formed on the substrate by bringing the gaseous reactant mixture comprising a source of antimony and a source of tin into the presence of a heated source of oxygen (see Figure 1b and corresponding description, Col.6, Col.9, lines 46 – 68, and Col.10, lines 1 – 55 of Kalbskopf et al.)
- Claims 31 and 55 – The steps of mixing the reactants in the gaseous phase to provide a gaseous reactant mixture, feeding the gaseous reactant mixture to a first nozzle, feeding superheated water vapor to a second nozzle, and causing the gaseous reactant mixture from the first nozzle to be brought into the presence of the superheated water vapor from the second nozzle to form the tin/antimony oxide coating layer (see Figure 1b and corresponding description, Col.6, Col.9, lines 46 – 68, and Col.10, lines 1 – 55 of Kalbskopf et al.). Please note that the water vapor is transported to the nozzle at a temperature of about 110° C (i.e., it is "superheated") (Col.6, lines 1 – 36, and Col.10, lines 10 – 15).
- Claims 37 – 40 and 62 – 64 – The coating layer has a Sb/Sn ratio of at least 0.03, preferably at least 0.05, preferably ranging from 0.05 to 0.15, preferably ranging from 0.03 to 0.09 (Example 3 of Kavka).
- Claims 41, 42, 65, and 66 – The tin/antimony oxide coating layer has a thickness of 100 to 500 nm, specifically from 250 to 450 nm (see paragraph 14 above).

- Claims 43 – 44 and 67 – 68 – The glazing panel has a solar factor of less than 60%, preferably less than 50%. While not explicitly taught by Kavka, the solar factor of the coating inherently has the values claimed by the applicant (see paragraph 13 above).
- Claims 45 – 46, 61, and 69 – 70 – The glazing panel has a luminous transmittance of less than 70%, preferably less than 60%, preferably ranging from 40 to 65%. Specifically, Kavka teaches that the luminous transmittance is from 63 – 70% (Example 3). While this range does not quite overlap the applicant's claimed range of less than 60%, the examiner maintains that the lower portion of the range disclosed by Kavka (i.e., TL of 63%) is close enough to the applicant's claimed range (e.g., TL of 60%) that one skilled in the art would have reasonably expected the glazing panels to have essentially the same properties, thereby providing a *prima facie* case of obviousness (see *Titanium Metals Corp. of America v. Banner*, 227 USPQ 773 (Fed. Cir. 1985)). In the alternative, Buffat et al. teach that the solar factor of a glazing pane is a result / effective variable that must be balanced with the desired light transmission of the pane in order to optimize factors such as (1) how much light is allowed to pass through the pane and (2) the cost of air conditioning (Col.1, lines 5 – 50). Therefore, it would have been obvious to one of ordinary skill in the art to optimize, especially minimize, the solar factor of the glazing pane of Kavka as a result / effective variable through routine experimentation in order to

optimize / balance factors such as how much light is allowed to pass through the pane and the cost of air conditioning. In doing so, one of ordinary skill in the art would also have necessarily optimized the TL (luminous transmittance) value of the glazing panel.

- Claims 47 and 71 – The substrate is a clear sheet of glass (Example 3 of Kavka).
- Claims 48 and 72 - The substrate is a colored sheet of glass. Specifically, Kavka teaches glass substrates in general, including window glass for buildings (page 2, paragraph 4, and Example 3). Terneu et al.(3) teach that in the art of coating glass with doped tin oxide coating layers, it is beneficial in some embodiments to use colored glass in order to reduce glare, thereby providing comfort to the user (Col.8, lines 18 – 30). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a colored glass substrate in the process of Kavka with the reasonable expectation of successfully reducing the glare of the finished coated glass product and providing comfort to the user.
- Claims 50 and 74 – The tin/antimony oxide coating layer is an exposed coating layer. Specifically, Kavka does not teach that the tin/antimony oxide coating layer is further coated or covered (i.e., it is "exposed").
- Claim 94 – The glazing panel has a luminous reflectance (RL) measured with Illuminant C of less than 11%. Specifically, the combination of Kavka, Kalbskopf et al., Terneu et al.(3), and Buffat et al. is silent regarding the

luminous reflectance of the glazing panel. However, the aforementioned combination of references does teach each and every limitation of the applicant's claims, including the composition of the claimed coating (e.g., the Sb/Sn molar ratio in the oxide) and the thickness of the claimed coating. Therefore, unless essential steps and/or limitations are missing from the applicant's claims, the glazing panel produced by the process of the combination of Kavka, Kalbskopf et al., Terneu et al.(3), and Buffat et al. would have inherently had the claimed luminous reflectance value.

16. Claims 32 – 34 and 56 – 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kavka (CS 239788 B1) in view of Kalbskopf et al. (USPN 4,294,868), in further view of Terneu et al.(3) (USPN 4,900,634) and Buffat et al. (USPN 5,657,149), and in further view of either Terneu et al.(1) (GB 2 234 264 B) or Porter (EP 0 174 727 A1).

17. The combination of Kavka, Kalbskopf et al., Terneu et al.(3), and Buffat et al. teaches all the limitations of **Claims 32 – 34 and 56 – 58** as set forth in paragraphs 14 and 15 above, except for a method further comprising depositing at least one intermediate coating layer (haze reducing or antireflection) between the substrate and the tin/antimony oxide coating layer, the intermediate coating layer being comprised of one of SiO_2 or SiO_x. Both Terneu et al.(1) and Porter teach that, in the art of depositing doped tin oxide coating layers on glass substrates, it was known at the time of the applicant's invention to deposit a silicon oxide intermediate coating

layer between the glass substrate and the doped tin oxide coating layer in order to prevent haze from forming in the coating (page 1 of Terneu et al.(1), and pages 1 and 3 of Porter). Therefore, it would have been obvious to one of ordinary skill in the art to deposit a silicon oxide haze-reducing intermediate coating layer between the glass substrate and the antimony-doped tin oxide coating layer of Kavka with the reasonable expectation of successfully preventing the coating / coated substrate of Kavka from developing haze.

18. Claims 35, 36, 59, 60, and 95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kavka (CS 239788 B1) in view of Kalbskopf et al. (USPN 4,294,868), in further view of Terneu et al.(3) (USPN 4,900,634) and Buffat et al. (USPN 5,657,149), and in further view of Terneu et al.(2) (GB 2 274 115 A).
19. The combination of Kavka, Kalbskopf et al., Terneu et al.(3), and Buffat et al. teaches all the limitations of **Claims 35, 36, 59, 60, and 95** as set forth in paragraphs 14 and 15 above, except for a method further comprising the step of depositing at least one additional ("low emissivity") coating layer comprised of tin oxide doped with fluorine (from gaseous reactants) on the tin/antimony oxide coating layer. However, it is the object of Kavka to produce a coated glass sheet with so-called heat reflective layers (i.e., high reflectivity in the infrared part of the spectrum) (page 2, paragraphs 2 – 4). Terneu et al.(2) teach that it was known in the art of depositing doped tin oxide coating layers on glass substrates for the purpose of reflecting infrared radiation (i.e., the same objective as Kavka) at the time of the

applicant's invention to utilize either a single coating or a multi-layer coating of materials such as tin oxide doped with fluorine and tin oxide or oxides in general (page 1, page 14, and page 15, lines 1 – 8). In other words, Terneu et al.(2) teach the functional equivalence of single layer oxide coatings (e.g., tin oxide or fluorine-doped tin oxide) and multi-layer oxide coatings in the art of reflecting IR radiation. The reactants used to deposit the coatings are in the gaseous phase (pages 1 and 14 – 15). Therefore, it would have been obvious to one of ordinary skill in the art to deposit at least one additional ("low emissivity") coating layer comprised of tin oxide doped with fluorine (from gaseous reactants) on the tin/antimony oxide coating layer of Kavka with the reasonable expectation of success (i.e., successfully depositing an IR-reflecting coating material (as desired by both Kavka and Terneu et al.(2)) that can be utilized either in a single layer coating (as taught by both Kavka and Terneu et al.(2)) or a multi-layer coating (as taught by Terneu et al.(2))) and obtaining similar results, regardless of whether a single-layer or multi-layer IR reflecting coating is utilized. Please note that a fluorine-doped tin oxide coating is a "low emissivity" coating (See, for example, Thomas et al. (USPN 4,968,563), Col.2, lines 26 – 39).

20. Claims 49 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kavka (CS 239788 B1) in view of Kalbskopf et al. (USPN 4,294,868), in further view of Terneu et al.(3) (USPN 4,900,634) and Buffat et al. (USPN 5,657,149), and in further view of Beaufays et al. (USPN 5,573,839).

21. The combination of Kavka, Kalbskopf et al., Terneu et al.(3), and Buffat et al. teaches all the limitations of **Claims 49 and 73** as set forth in paragraphs 14 and 15 above, except for a method wherein the glazing panel is a monolithic glazing panel. However, Kavka suggests the production of window glass for buildings in general (page 2, paragraph 4). Beaufays et al. teach that one example of window glass for buildings is a monolithic glazing pane (Col.1, lines 10 – 30). Therefore, it would have been obvious to one of ordinary skill in the art to perform the method of Kavka and Kalbskopf et al. in order to produce a monolithic glazing pane with the reasonable expectation of success (i.e., choosing a specific example of a window glass pane (i.e., a monolithic glazing pane) from the broad genus of glass substrates / window glass taught by Kavka).

22. Claims 51, 52, 75, and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kavka (CS 239788 B1) in view of Kalbskopf et al. (USPN 4,294,868), in further view of Terneu et al.(3) (USPN 4,900,634) and Buffat et al. (USPN 5,657,149), and in further view of Toyonaga et al. (USPN 4,859,496).

23. The combination of Kavka, Kalbskopf et al., Terneu et al.(3), and Buffat et al. teaches all the limitations of **Claims 51 – 52 and 75 – 76** as set forth in paragraphs 14 and 15 above, except for a method wherein the reactants for forming the tin/antimony oxide coating layer comprise monobutyl trichloro tin (MBTC) and an organo antimony compound. Specifically, both Kavka and Kalbskopf et al. teach $SnCl_4$ as the tin compound reactant and either $SbCl_3$ or $SbCl_5$ as the antimony

compound reactant (Example 3 of Kavka, and Col.10 of Kalbskopf et al.). Toyonaga et al. teach the functional equivalence of the tin and antimony compounds taught by Kavka and Kalbskopf et al. (i.e., $SnCl_4$, $SbCl_3$, and $SbCl_5$) and MBTC and organo antimony compounds, respectively, in the process of depositing a doped tin oxide film (Col.8, lines 65 – 68, and Col.9, lines 1 – 13 and 30 – 37). Therefore, it would have been obvious to one of ordinary skill in the art to utilize MBTC and an organo antimony compound as the tin and antimony gaseous phase reactants in the process of Kavka and Kalbskopf et al. with the reasonable expectation success and of obtaining similar results (i.e., successfully depositing a Sb/Sn oxide layer, regardless of what specific antimony- and tin-based precursor materials are utilized).

Response to Arguments

24. Applicant's arguments filed on 2/20/2004 have been fully considered but they are not persuasive.
25. First, please note that the applicant's arguments regarding the Section 112 rejections (see pages 13 – 15 of the response filed on 2/20/2004) have been fully addressed by the examiner in paragraphs 7 – 10 above.
26. Regarding the prior art rejections, the applicant argues that Kavka relates to spray coating while Kalbskopf relates to CVD coating, there is no teaching or motivation to combine these two technologies, and the potential for a lack of predictability for one of ordinary skill in the art trying to re-create the coating of Kavka by using the CVD deposition method suggests the need for undue experimentation. This argument is

not persuasive for the following reasons. First, while Kavka does generally relate to spray coating, Kavka also suggests that doped tin oxide coatings can be deposited by utilizing reactants in the gaseous phase (page 2, paragraph 5). Second, Kalbskopf et al. explicitly teaches that, in the art of depositing antimony-doped tin oxide coatings on a glass substrate, it was known at the time of the applicant's invention to deposit antimony-doped tin oxide coatings pyrolytically by utilizing tin and antimony compound reactants in the gaseous phase (Col.1, lines 6 – 46, Col.3, lines 5 – 12 and 31 – 43, Col.5, Col.6, lines 26 – 54, Col.9, lines 51 – 68, Col.10, lines 1 – 45, and Figure 1b). Kalbskopf et al. also teaches that this coating method has the advantages of making it possible to carry out the coating at a very high speed, producing a layer of excellent homogeneity, and guaranteeing a very high performance level with respect to mechanical qualities, electrical qualities, and optical qualities of all kinds (Col.4, lines 22 – 28). Contrary to the applicant's assertion, this teaching provides a strong motivation to combine Kavka with Kalbskopf et al. in the manner done so by the examiner. Additionally, the examiner admits that some amount of experimentation would be required to deposit the (spray coated) antimony-doped tin oxide coatings of Kavka by using the CVD method of Kalbskopf et al. However, the amount of experimentation would not be undue. For example, one of ordinary skill in the CVD art would be expected to readily recognize that the dopant (e.g., antimony) level in a coating is primarily determined by the amount of dopant precursor material supplied in comparison to the amount of film forming (e.g., tin) material. Therefore, to simply adjust / choose these parameters

(i.e., tin and antimony precursor supply rates) to obtain a coating having a desired Sb/Sn molar ratio (i.e., dopant ratio) would be well within the level of ordinary skill in the CVD art and would not require undue experimentation. Please note that obviousness does not require absolute predictability (*In re Moreton*, 129 USPQ 288). Additionally, please note that, in judging the level of ordinary skill in the art, it is the level of those who normally attack the problems of the art that count; persons who do most of the problem solving in the CVD art are graduate engineers and as such are chargable with general knowledge concerning principles of engineering outside the narrow field involved, and with skills, ingenuity, and competence of the average professional engineer (*Mueller Brass Co. v. Reading Industries*, 176 USPQ 361). In the case of the CVD art, these skills would include using appropriate supply rates and ratios in order to obtain a coating having a desired composition or dopant level. The examiner's position is further supported by Kane et al. (USPN 3,949,146), which teaches that, in the art of depositing tin oxide and antimony-doped tin oxide coatings, optimum parameters employed can be determined by a series of test runs as will be known to one skilled in the art (Col.1, lines 7 – 11, Col.3, lines 5 – 51, and Example 3 / Table III).

27. Second, the applicant argues that the applicant is attempting to solve a different problem than that of Kavka (i.e., the applicant's goal is opposite of the teachings of Kavka). In response to this argument, the fact that applicant has recognized another advantage (i.e., reducing the amount of light and/or heat energy entering and remaining within the room) which would flow naturally from following the suggestion

of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). The applicant appears to focus on the "high light transmission" in the visible portion of the spectrum taught by Kavka. However, the light transmission taught by Kavka (i.e., 63 to 70%) is within / overlaps the applicant's claimed range of light transmission values, and thus it is unclear how the applicant's glazing panel and the glazing panel of Kavka differ in this respect. Additionally, the applicant focuses this argument on the Kavka reference alone. Please note that one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, even if the process of the combination of Kavka, Kalbskopf et al., and Terneu et al.(3) does not inherently produce a glazing panel having a solar factor of less than 70%, Buffat et al. teaches that a <u>low solar factor is desired</u> for architectural glazing panes so that the panes contribute as little as possible to the rise in temperature inside a building, thereby reducing the cost of air conditioning (Col.1, lines 5 – 50). Further, Buffat et al. teach that the solar factor of a glazing pane is a result / effective variable that must be balanced with the desired light transmission of the pane in order to optimize factors such as (1) how much light is allowed to pass through the pane and (2) the cost of air conditioning (Col.1, lines 5 – 50). Therefore, it would have been obvious to one of ordinary skill in the art to optimize, especially minimize, the solar factor of the glazing pane of Kavka as a

result / effective variable through routine experimentation in order to optimize / balance factors such as how much light is allowed to pass through the pane and the cost of air conditioning.

28. Third, the applicant argues that there is no motivation to increase the thickness of the coating of Kavka. In response, the examiner has not argued that it would have been obvious to increase the thickness of the coating of Kavka. Briefly, Kavka is silent as to the exact thickness of the coating layer but does suggest that coatings with a thickness on the order of <u>hundreds of nanometers</u> are operable (page 2, paragraph 3). At the very least, this range of coating thickness values taught by Kavka encompasses the applicant's claimed and disclosed coating thickness values (i.e., 100 to 500 nm). Terneu et al.(3) teach that, in the art of depositing doped tin oxide coatings on glass substrates for the purposes of reflecting IR-radiation (i.e., the same objective as Kavka), the coatings preferably have a thickness of from 400 nm to 500 nm in order to balance factors such as internal haze, emissivity, and coloration (Col.1, lines 5 – 57, and Col.6, lines 16 – 36). As such, one of ordinary skill in the art would have been motivated to deposit the coating layer of Kavka to a thickness of 400 nm to 500 nm (i.e., in the range claimed by the applicant) as taught by Terneu et al.(3) with the reasonable expectation of (1) success, as both Kavka and Terneu et al.(3) teach that such coating thickness values are operable, and (2) obtaining the benefit of balancing factors such as internal haze, emissivity, and coloration as taught by Terneu et al.(3).

29. Fourth, the applicant argues that Kavka achieves the best results when using tin oxide containing fluorine, not when using tin oxide containing antimony. In response, please note that the disclosure of a reference is not limited to its preferred embodiments. In this case, Example 3 of Kavka is clearly an embodiment of the invention, and one of ordinary skill in the art would have interpreted it as such for the purposes of improving and/or modifying the process in the manner set forth by the examiner.

30. Fifth, the applicant argues that there is no teaching or suggestion in the cited references to deposit a separate fluorine doped SnO_2 layer over an antimony doped SnO_2 layer. In response, this argument is not convincing. Briefly, it is the object of Kavka to produce a coated glass sheet with so-called heat reflective layers (i.e., high reflectivity in the infrared part of the spectrum) (page 2, paragraphs 2 – 4). Terneu et al.(2) teach that it was known in the art of depositing doped tin oxide coating layers on glass substrates for the purpose of reflecting infrared radiation (i.e., the same objective as Kavka) at the time of the applicant's invention to utilize <u>either</u> a single coating or a multi-layer coating of materials such as tin oxide doped with fluorine and tin oxide or oxides in general (page 1, page 14, and page 15, lines 1 – 8). In other words, Terneu et al.(2) teach the functional equivalence of single layer oxide coatings (e.g., tin oxide or fluorine-doped tin oxide) and multi-layer oxide coatings in the art of reflecting IR radiation. The reactants used to deposit the coatings are in the gaseous phase (pages 1 and 14 – 15). Therefore, it would have been obvious to one of ordinary skill in the art to deposit at least one additional ("low emissivity")

coating layer comprised of tin oxide doped with fluorine (from gaseous reactants) on the tin/antimony oxide coating layer of Kavka with the reasonable expectation of success (i.e., successfully depositing an IR-reflecting coating material (as desired by both Kavka and Terneu et al.(2)) that can be utilized either in a single layer coating (as taught by both Kavka and Terneu et al.(2)) or a multi-layer coating (as taught by Terneu et al.(2))) and obtaining similar results, regardless of whether a single-layer or multi-layer IR reflecting coating is utilized.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cronin et al. (USPN 5,900,275) teaches reducing haze in a conductive tin oxide coating by depositing a layer of fluorine-doped tin oxide over tin oxide coated glass (Example 6). Guiselin et al. (USPN 6,042,934) teaches that a coated glass glazing should have a light transmission value between 60 and 70% and a solar factor of 0.32 to 0.42 (i.e., 32 – 42%) (i.e., values within the range claimed and disclosed by the applicant) to be completely suitable for use in buildings (Col.4, lines 31 – 37).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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